



ISSN: 2350-0328

**International Journal of Advanced Research in Science,  
Engineering and Technology**

**Vol. 5, Issue 5, May 2018**

# An Innovative Automated Examination System (AES)

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**ABSTRACT:** Optical mark recognition (OMR) technology has changed much in recent years. In recent years schools, colleges and classes we use OMR technology. Exams are conducted using OMR answer sheet checking system because by using this technology the exams can be conducted in a more efficient and secure manner. Also, with this technology verifying and validating the exam papers is easy, reliable and less time consuming. In this paper we have proposed some simpler and effective way to carry out the examination system using OMR and image processing technology.

**KEYWORDS:** OMR, Image processing, Pattern Recognition, Examination system.

## I. INTRODUCTION

In today's educational system, there is a need to evaluate students learning very frequently as a part of the continuous assessment. Many universities insist continuous assessment of students through quiz, assignments, class tests etc. To evaluate the student learning frequently and quickly, multiple choice-based questions are quite useful. Multiple choice tests often require less time for a given amount of material than tests requiring written responses. This results in a more comprehensive assessment of the candidate's extent of knowledge. Even though greater efficiency can be created by the use of online examination delivery software, practically it is infeasible due to the abundant requirement of computer laboratories.

The most common use of OMR is to process student responses to a multiple choice exam, or responses to a questionnaire or feedback form after which the questions are provided on paper, and students mark their responses onto special pre-printed forms. Basically, the main task is to detect the presence and absence of circle filling and extract the information depending upon these marks from an image. There are number of software and hardware in present market that are professionally used to detect such images.

Ultimately any technology introduced should serve the purpose of wellbeing of common community. Optical Mark Recognition (OMR) is a data capture technology used for automated data assessment. It is gaining wide acceptance in educational institutes for computer aided assessment. This technology provides a solution for reading and processing large number of forms such as questionnaires or multiple-choice tests. Today we find that lot of competitive exams are being conducted as entrance exams. These exams consist of MCQs. The students have to fill the right box or circle for the appropriate answer to the respective questions. So our aim is to develop Image processing based Optical Mark Recognition sheet scanning system.

## II. LITERATURE SURVEY

Garima Krishna et al. [1] proposed OMR technology with the help of ordinary scanner which enables implementation of OMR using an ordinary scanner. It provides tools to the user to design an OMR sheet based on the layout they want. The design of the sheet will be stored as image file format. Then user can take as many print outs as required, distribute it among others from whom information is desired, and get the filled sheets scanned. The scanned image files will then be provided as input to the software, processing will be done, value of filled fields will be extracted and then the data will be manipulated as instructed by the user.

Tanvi Sharma et al. [2] proposed OMR, which facilitates the OMR answer sheet assessment technique which must be feasible and efficient. The objective is to eliminate the use of dedicated hardware which in turns very costly, so the assessment of OMR answer sheet could be done by the simple scanned image of that sheet using simple scanner.

Houbakht Attaran et al. [4] proposed an application in which one of the most important usages of OMR is checking multiple choices question exam students choose the answer by filling square choice on a printed paper. Then after scanning, these papers will be checked by special software automatically. This article is written based on morphology

and rejection error algorithm which is included: scanning, preprocess, steps, basic identify, checked steps, and conclusion of different tests.

Hui Deng et al. [5] proposed a Low-Cost OMR solution for educational applications in which a low-cost OMR (LCOMR) technique is presented. Besides implementing all the functions of the traditional OMR, LCOMR supports plain sheets (70 gsm or less) and low printing quality sheets, which include the image scan, tilt correction, scanning error correction, regional deformation correction and mark recognition, are presented.

W. Krattenthaler et al. [6] proposed a new reduced-cost correlation technique (called “point correlation”) where matching is not performed with the entire template but with a precomputed set of points of this template. We introduce a method to iteratively select a set of points which is optimal in a heuristic way.

Dillman studied the impact of OMR forms on which it responded it to be relevant issue. One possible disadvantage with OMR surveys is that they may suppress response rates. OMR surveys are often combined with other cost-cutting measures (e.g., no follow up), so their low response rates may simply be an artifact of other choices about survey administration. Generally OMR forms have one standard ink color that provides limited visual appeal creating a disincentive for their response. Moreover these forms are also more tedious to fill out. Rather than simply reading through the survey and checking off or circling responses, the respondent must carefully fill in a circle or “bubble” for each question answer [7].

### III. METHODOLOGY

The architecture diagram of the overall system is given in Figure 3.1. The major modules are designing the user required OMR sheets, Print the sheets, and Scan the filled OMR sheets, Read, Analysis.

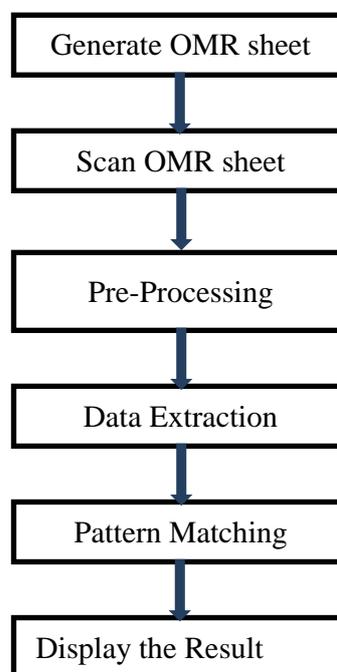


Fig 3.1 System architecture for OMR assessment system

**Generate OMR sheet:** Giving required information to generate outline of the OMR sheet in required format with required fields.



ISSN: 2350-0328

# International Journal of Advanced Research in Science, Engineering and Technology

Vol. 5, Issue 5, May 2018

**Scan OMR sheet:** Scan the Filled OMR sheet with the suitable scanner having higher resolution. **Pre-processing:** pre-process the input scanned image of the OMR sheet. This step involves converting the image into black and white image (Binary image). Then inverting the binary image, after the inversion of the scanned image erosion and dilation operations are performed to remove unwanted pixels and add necessary pixels to the image respectively. The erosion and dilation operation is performed in order to remove the noise from the image.

**Data Extraction:** It takes the processed image of the OMR sheet and suitable methods are used to detect the filled circles.

**Pattern Matching:** it matches the extracted data with already existing data in the database i.e. it compares the detected circle with the answer previously stored in the database. The total number of wrong and correct answer is calculated.

**Displaying the result:** According to pattern matching, it displays name of the students along with the marks in a required format.

In this system OMR answer sheet will be scanned and the scanned image of the answer sheet will be given as input to the software system. Using Image processing, we will find the answers marked for each of the questions, total marks and displaying of total marks will be also implemented.

## IV. CONCLUSION

The proposed Automated Examination System (AES) for computer aided assessment is best suited in current scenario of innovative learning because the form design can be customized by user. User is provided with an easy Graphical User Interface (GUI), which helps to design own forms or modify existing ones, and evaluate and store the filled forms in an Excel spread sheet. The system can be used for computer aided assessment of class tests. The system is designed and implemented with minimum cost. The system is designed with easy user interface. The existing systems available for the same purpose are costly, working on particular scanners only and dependent on other parameters such as paper and print quality. The proposed system consists of an ordinary printer, scanner and a computer to perform computation. Finally, Automated Examination System (AES) used in many universities has given best results in student evaluation components pertaining to courses.

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